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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,907	11/26/2001	Sekharipuram R. Narayanan	06618/733001 / CIT 3338	7370

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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1745

6

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/994,907

Applicant(s)

NARAYANAN ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 6) ☐ Other: _____

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: Non-initialed and/or non-dated alterations have been made to the oath or declaration (in the second inventor's address). See 37 CFR 1.52(c).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 116, 280, 290. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 3 recites a "wicking part" which feeds methanol to the membrane.

The specification does not appear to disclose such a wicking part. Accordingly, it is believed that the specification fails to provide proper antecedent basis for the subject matter of claim 3.

Claim Objections

4. Claim 5 is objected to because of the following informalities: in the second-to-last line, the phrase "a ratio of" appears to be extraneous. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 10-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10 recites the limitation "the catalyst layer coating" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 4, 5, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Watkins et al (U.S. Patent 5,108,849). Regarding claims 1 and 5, the reference is directed to a fuel cell comprising a plurality of substantially parallel membranes (see Figure 1; col. 2, line 38). A plurality of electrodes (16, 18) are in contact with the membranes. A plurality of interconnects (12, 13) are located between adjacent ones of the electrodes. Regarding claim 1, current flows in a direction across the membranes. Regarding claims 1, 4, and 5, the ratio of the area of an interconnect to the area of an electrode is at least 0.2 (the interconnects are substantially the same size as the membranes; see Fig. 1). Regarding claims 8 and 9, the interconnect comprises graphite and a thermoplastic heat curing binder (see col. 4, lines 11-41). Regarding claim 7, the reference does not expressly teach that the interconnect is “formed of a paste.” However, this limitation is a process limitation because it recites the state of the interconnect material before the final product is formed, and therefore does not need to be accorded patentable weight. Generally, process limitations in product claims do not need to be accorded patentable weight since they do not further limit the structure of the product (MPEP §2113).

Thus, the instant claims are anticipated.

9. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukui et al (U.S. Patent 4,537,840). Regarding claims 1 and 5, the reference is directed to a fuel cell comprising a plurality of substantially parallel membranes (4; see Figures 1 and 3). A plurality of electrodes (2, 3) are in contact with the membranes (see Figs. 1 and 2). A plurality of interconnects (20, 25)

are located between adjacent ones of the electrodes. Regarding claim 1, current flows in a direction across the membranes. Regarding claims 1, 4, and 5, the ratio of the area of an interconnect to the area of an electrode is at least 0.2 (the interconnects are substantially the same size as the membranes; see Fig. 2). Regarding claims 2 and 3, a wicking part (26) feeds methanol to the edges of the membranes (see Fig. 2).

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al (U.S. Patent 5,393,619) in view of Kato (U.S. Patent 6,127,059).

Mayer et al. is directed to a fuel cell having a plurality of membranes (13) in parallel with each other (see abstract; Figure 1). A cell separator (i.e., interconnector) (21) located between the cells (see Figure 1). The method of making the fuel cell includes the steps of coating an interconnect paste on electrodes associated with the membranes (col. 4, lines 38-42), and hot pressing the electrodes to form a membrane electrode assembly (col. 4, line 65).

The reference does not expressly teach the step of coating a catalyst layer on the membranes.

The patent of Kato is directed to PEM fuel cells. In column 4, line 57 et seq., the reference teaches that a catalyst layer is directly coated onto an electrolyte membrane.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Kato to incorporate the step of coating the membranes with catalyst into the process of Mayer et al. In the cited passage, Kato teaches that this produces a “solid polymer electrolyte having an integrally formed catalyst layer.” Accordingly, since the intimate contact of the catalyst and membrane would be beneficial to fuel cell performance, the artisan would be motivated to incorporate the step of coating the membranes with catalyst into the process of Mayer et al.

12. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al. in view of Kato as applied to claim 10 above, and further in view of Watkins et al.

Regarding claim 12, Mayer et al. further teach in column 4, lines 63-66 that the paste contains a heat-curable resin.

However, Mayer et al. do not expressly teach that the paste contains graphite, as recited in claim 11.

As set forth above, the patent of Watkins is directed to graphite-containing interconnect plates for fuel cells.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Watkins et al. to incorporate graphite into the interconnect material of Mayer et al. In column 4, line 23, Watkins et al. teach that “graphite is preferred because it is chemically inert in the environment used and inexpensive.” Accordingly, the artisan would be motivated to incorporate the graphite of Watkins et al. into the interconnect material of Mayer et al.

13. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al. in view of Kato as applied to claim 10 above, and further in view of Feigenbaum et al (U.S. Patent 4,450,212).

Mayer et al. do not expressly teach that the interconnect paste is applied using a hypodermic syringe.

The patent of Feigenbaum et al. is directed to edge seals for fuel cells. In column 8, line 54, the reference teaches that the edge seal paste is deposited in a groove by a pressure gun or syringe.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Watkins et al. to use a syringe to apply the interconnect paste of Mayer et al. As

would be appreciated by the artisan, such syringes allow the application of a metered amount of paste, therefore providing for even paste loading. Accordingly, the artisan would be motivated to use a syringe to apply the paste of Mayer et al.

Allowable Subject Matter

14. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:


Claim 6 recites that the ratio of interconnect area to electrode area is “substantially 0.2.” The above-applied references do not teach or fairly suggest this limitation. There is no suggestion to reduce the size of the interconnects so that they comprise only 20% of the area of the electrodes. Furthermore, this ratio is not recognized by the art of record as being result-effective, and thus, an artisan would not have sufficient motivation to optimize the ratio (MPEP 2144.05(II)(B)). Note that the area of the interconnect is interpreted herein as being the total area, not just the area that contacts the electrodes (e.g., projecting ribs).

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Patrick Ryan
Supervisory Patent Examiner
Technology Center

JSC

October 4, 2002